Pbar Week In Review

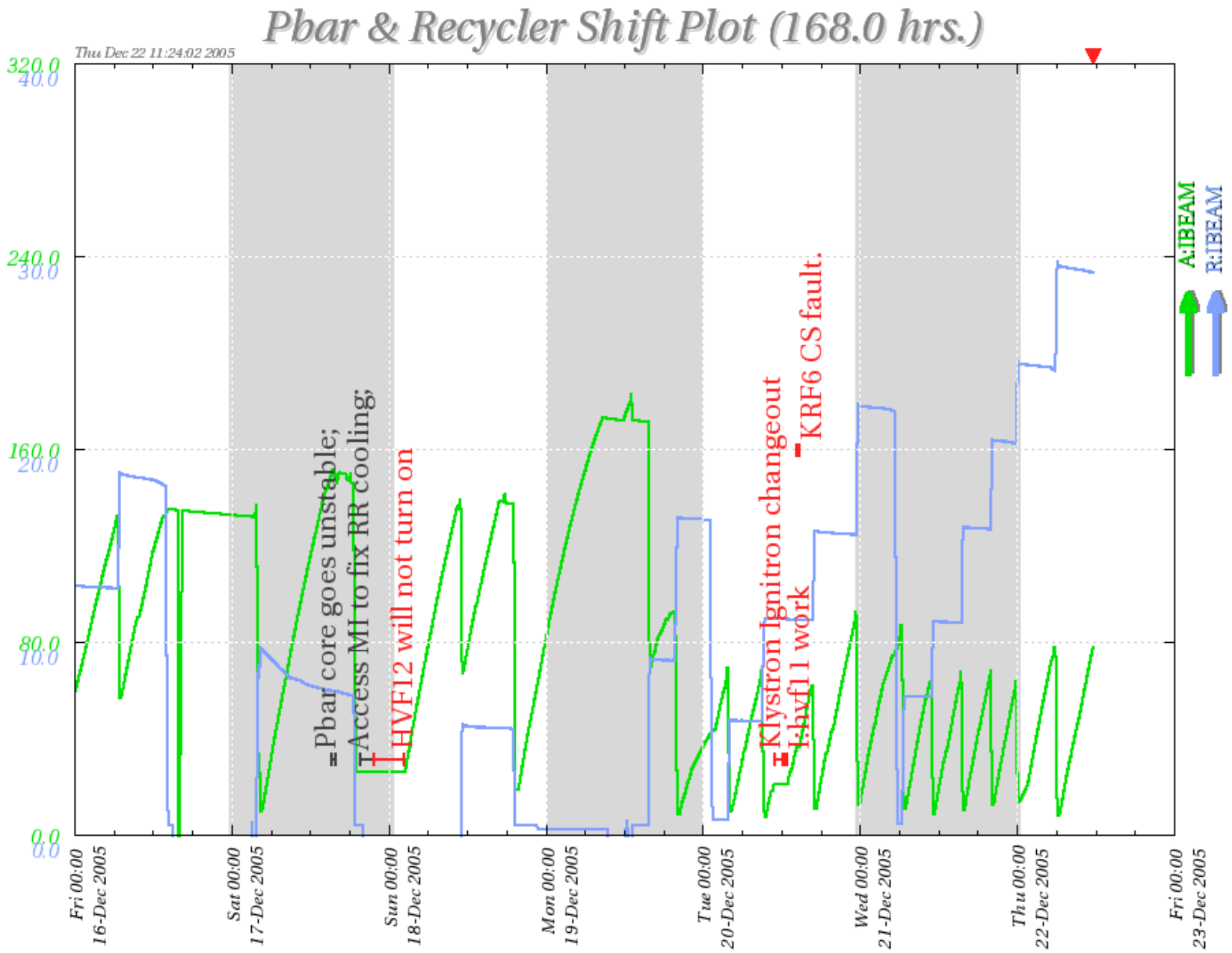
December 23, 2005

Brian Drendel

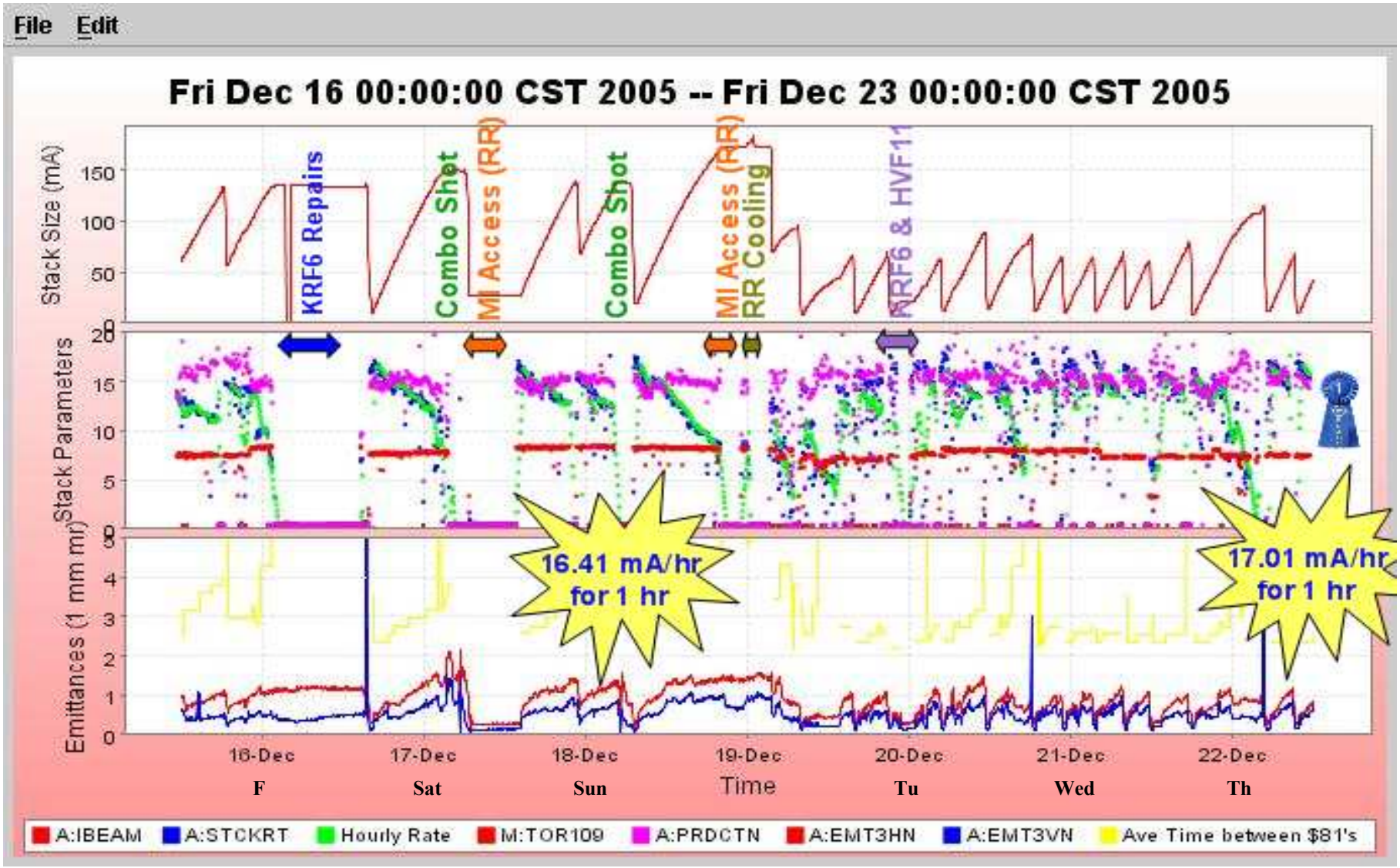
drendel@fnal.gov

Pbar Week in Review Topics

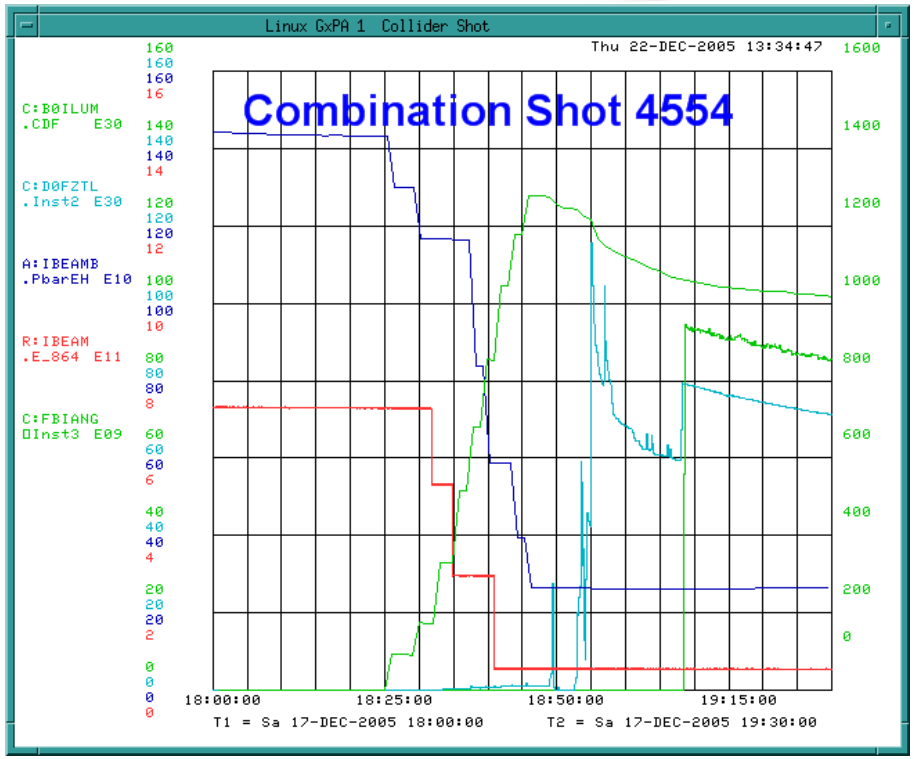
- Current Operations
  - This week's performance
    - Operations Summary
      - Stacking Record
      - Two Combo Shots
      - Shots to Recycler
    - Stacking comparisons
      - Current Conditions versus March 2005
- Dedicated Pbar Studies
  - Overview
  - Operational Changes
    - Target Tune is obsolete
    - Tune stacking from P1 to the Debuncher using BPMs.
  - Future Plans

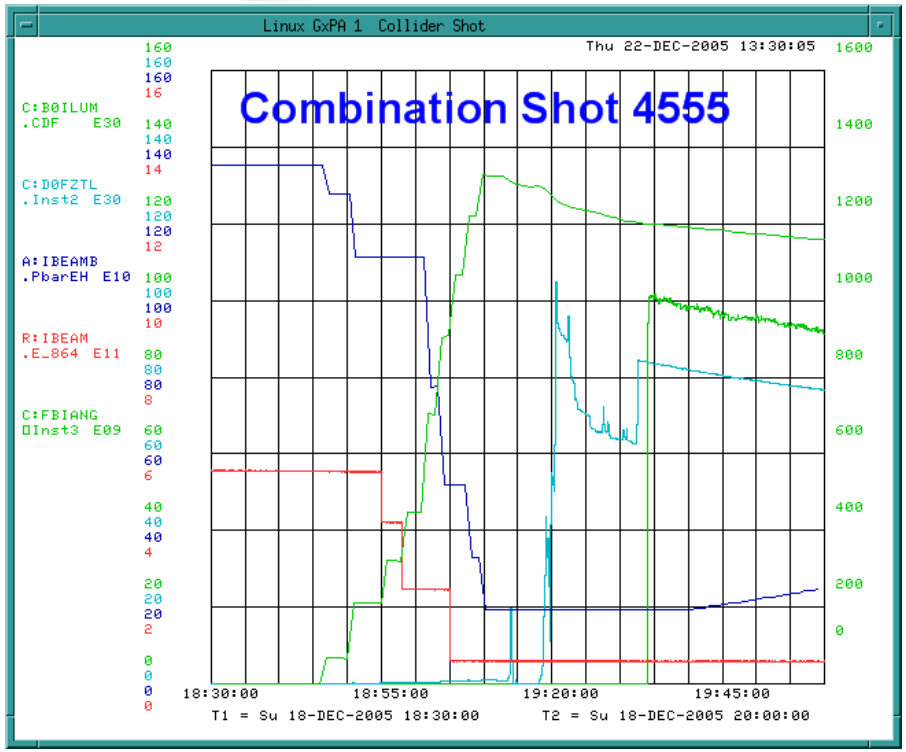

Pbar & Recycler Shift Plot (168.0 hrs.)
Thu Dec 22 11:24:02 2005
320.0
40.0
240.0
30.0
160.0
20.0
80.0
10.0
0.0
0.0
Pbar core goes unstable;
Access MI to fix RR cooling;
HVF12 will not turn on
Klystron Ignitron changeout
f:hvf11 work
KRF6 CS fault.
A:IBEAM
R:IBEAM
Fri 00:00 16-Dec 2005
Sat 00:00 17-Dec 2005
Sun 00:00 18-Dec 2005
Mon 00:00 19-Dec 2005
Tue 00:00 20-Dec 2005
Wed 00:00 21-Dec 2005
Thu 00:00 22-Dec 2005
Fri 00:00 23-Dec 2005

Pbar Week in Review - Performance



Combo Shots





- Two Combination Shots

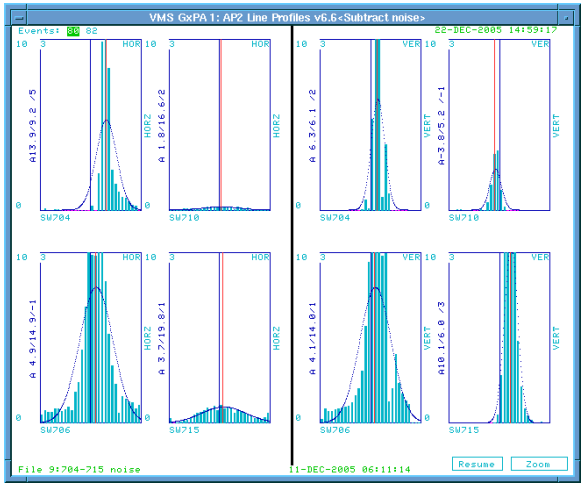
Beam Comparisons

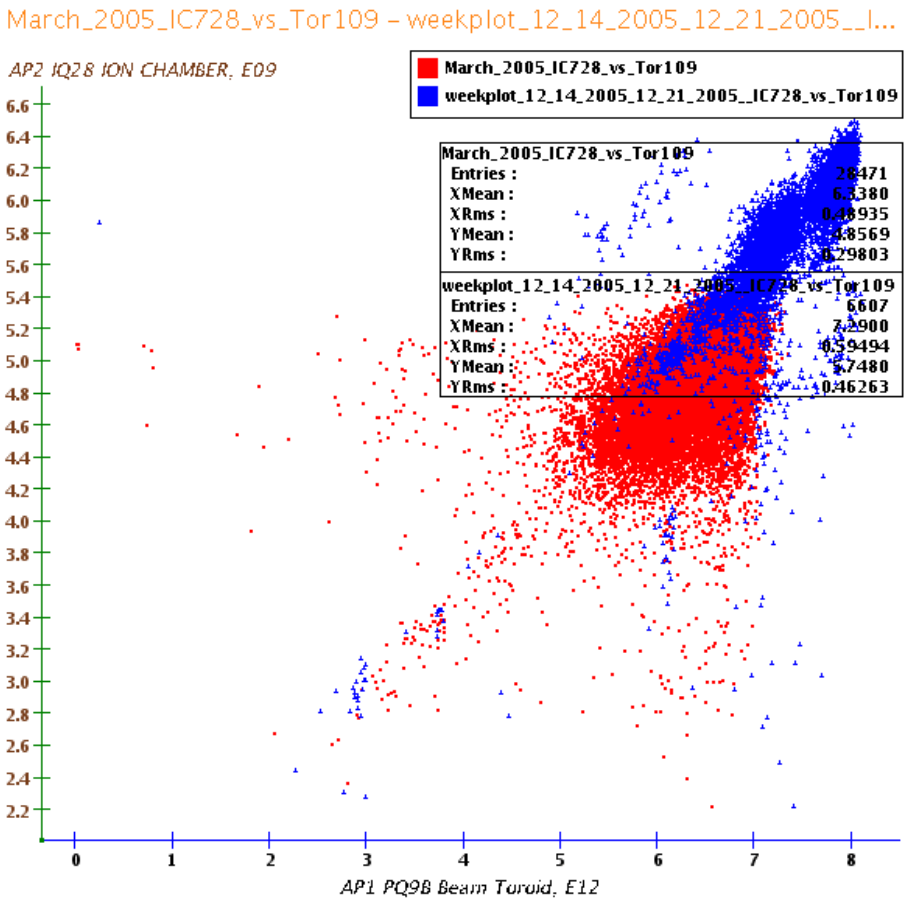
Compare current beam conditions with benchmark stacking conditions of March 2005:

- Beam Intensity on Target vs. Beam Intensity through the AP2 line
- Stack rate vs. Stack Size
- Production Efficiency vs. Stack Size

Beam on Target versus Beam to AP2

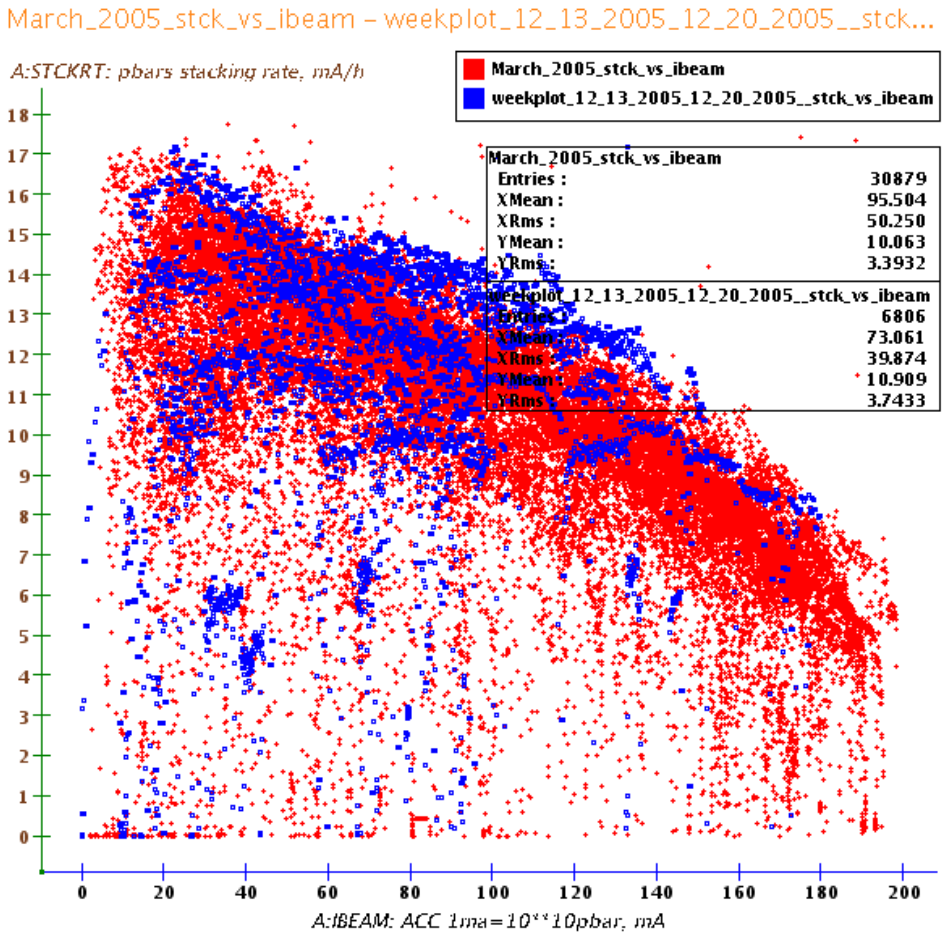
- Compared beam on target versus beam to the end of AP2 between March 2005 and this week
  - Blue Dots = Current Week
  - Red Dots = March 2005
  - More Beam = AP2 SEMs saturate!





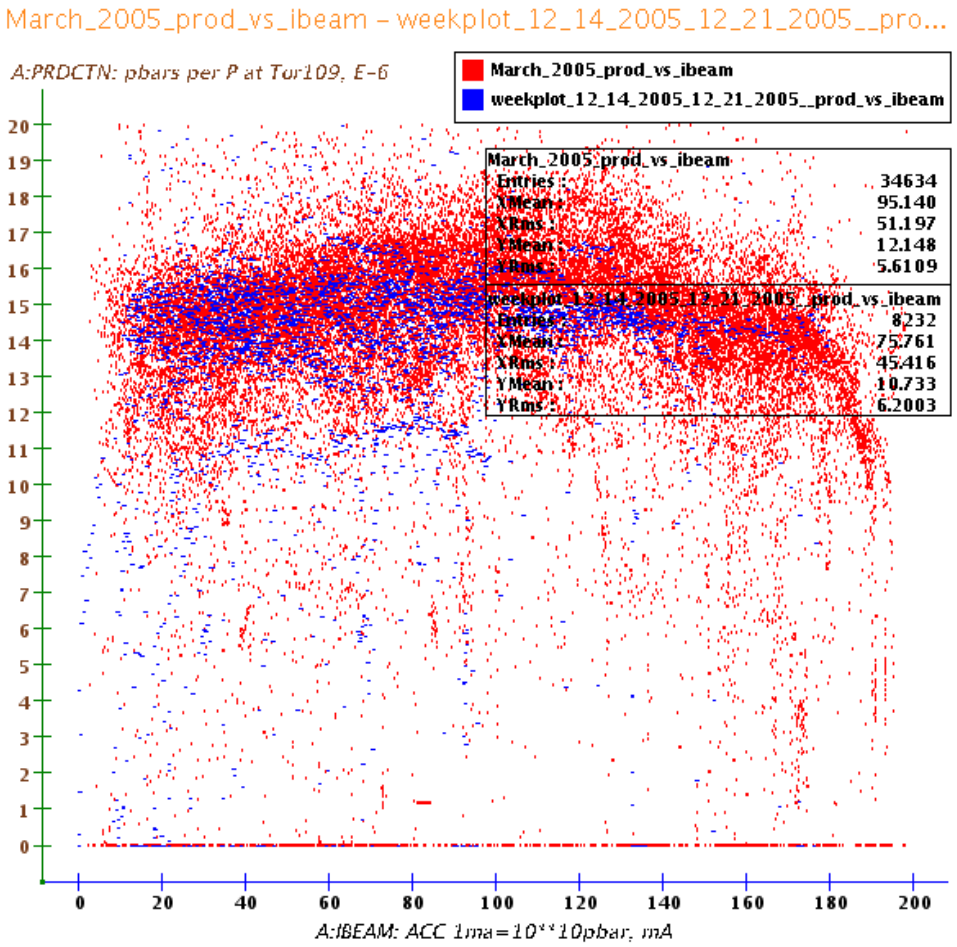
Pbar Week in Review - Stacking

- Compared stack rate versus stack size between March 2005 and this week.
  - Blue Dots = Current Week
  - Red Dots = March 2005



Pbar Week in Review - Stacking

- Compared Pbar Production Efficiency versus stack size between March 2005 and this week.
  - Blue Dots = Current Week
  - Red Dots = March 2005



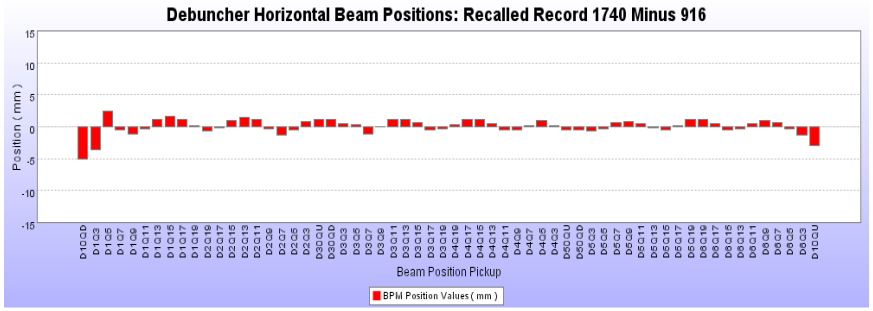
Pbar Dedicated Studies

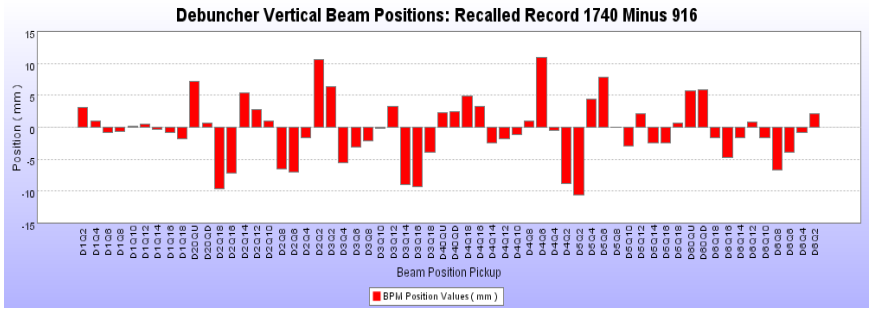
- By the Numbers
- Debuncher and AP2 orbits
- Accomplishments
- Resulting Operational Changes
  - Target Tune is Obsolete
  - P1 to AP2 tuning now is done using BPMs
- Schedule for Future Studies

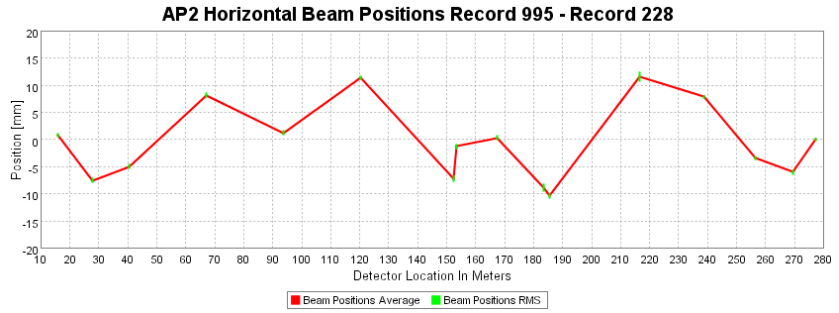
Dedicated Pbar Studies

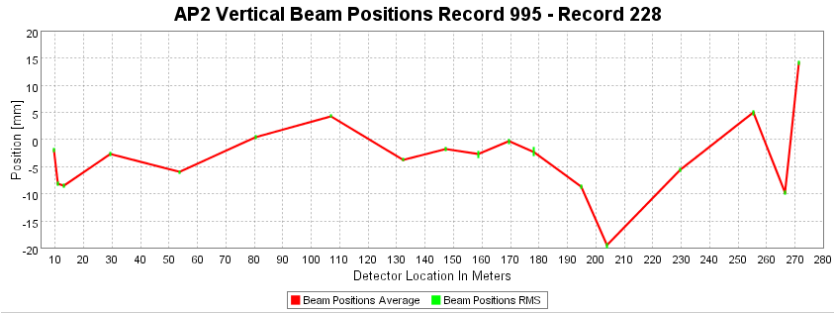
- Length of Time: **Mon Nov 21 to Thu Dec 15**
- Number of Elog shift pages: **72**
- Number of Recorded Debuncher Orbits: **857**
- Number of Recorded AP2 Orbits: **775**
- Number of Commissioned items: **12**
- Number of Major Accomplishments: **6+½ +½**
- Number of Confusions (at the time): ∞
- Number of Major Confusions Existing: **2**
- Number of Short Term Items To Do: **5**
- Number of "Next Time" Known Items: **7½**
- Number of Other Things Done: **8+1**

Debuncher and AP2 Orbit Changes









- Changes to Debuncher and AP2 Stacking Orbits

Accomplishments

- Lattice measurements for Debuncher and AP2
- Determine Debuncher Orbit/BPM-Quad offsets
- Corrected Debuncher Vertical Orbit to Quad Centers
- Centered Debuncher Components about orbit
- Determine AP2 Orbit/BPM-Quad offsets
- Set Orbit, Stands and Settings for AP2-Debuncher Injection Region
- Corrected AP2 Orbit to near Quad Centers
- Installed AP2 lattice that matches to Debuncher Lattice

½ done; more yet to do to finish

Documentation

We are in the process of documenting our work

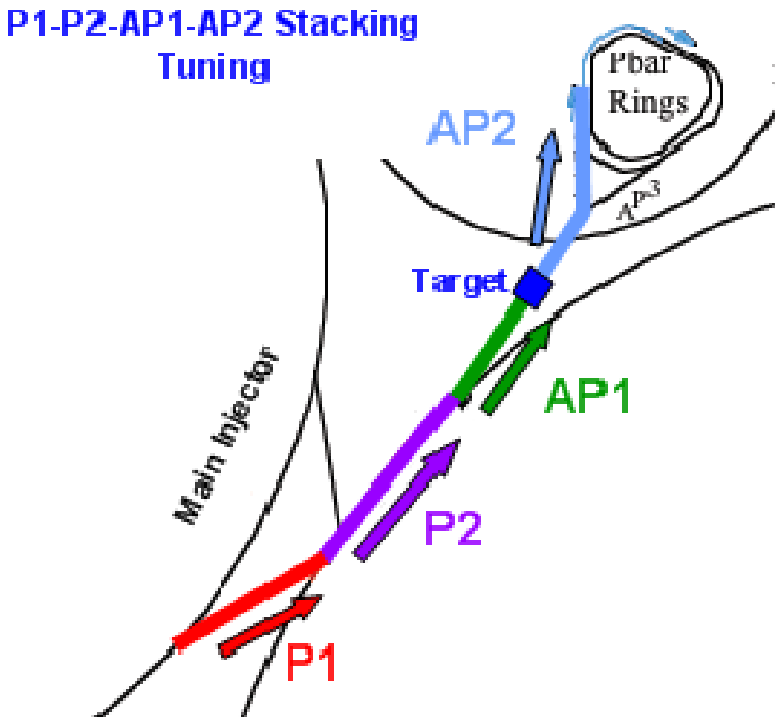
- Setup one-shots for circ beam in Deb
- Setup Deb partial turn beam up AP2
- Setup AP2 extraction of Deb circ beam
- Setup for D/A orbit studies
- Deb Orbit/BPM-Quad offset determination
- Deb Orbit Correction
- Deb Component Centering
- Deb Electrical Centering
- Deb Lattice Measurements
- Setting of the AP2-Deb Injection Region
- AP2 and Deb survey
- Lattice Design
- AP2 Orbit/BPM-Quad offset determination
- AP2 Orbit Correction
- AP2 Lattice Measurements
- Acc Injection region (kicker & septa)
- D/A Beam Based Alignment
- Acc Injection channel and orbit Apertures
- Deb Reverse Proton TBT system
- D/A Kicker time during stacking
- DRF2 timing
- P1-P2-AP1 drift and auto-tune
- AP2 Orbit drift and correction
- Stacking Losses at AP50

Operational Changes

- Major operational change as a result of the dedicated studies

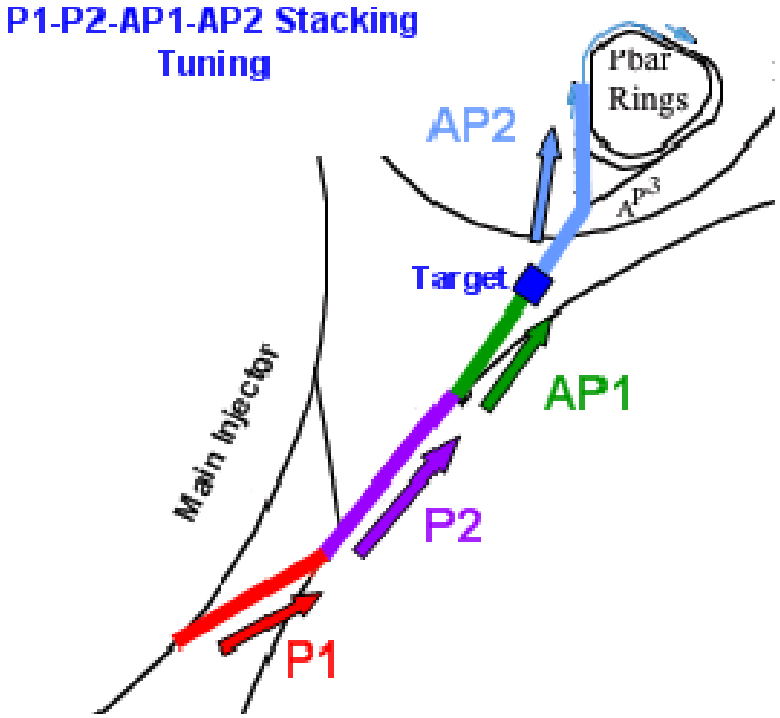
Target Tune is Obsolete

- **Old "target tune"**
  - Assume P1-AP1 ok
  - Maximize intensity to end of AP2 line with M:VT108 and M:HT105.
  - One bump AP2 line for maximum intensity
  - Use trims in the end of the AP2 line to close.
- **Target Tune is now obsolete.**



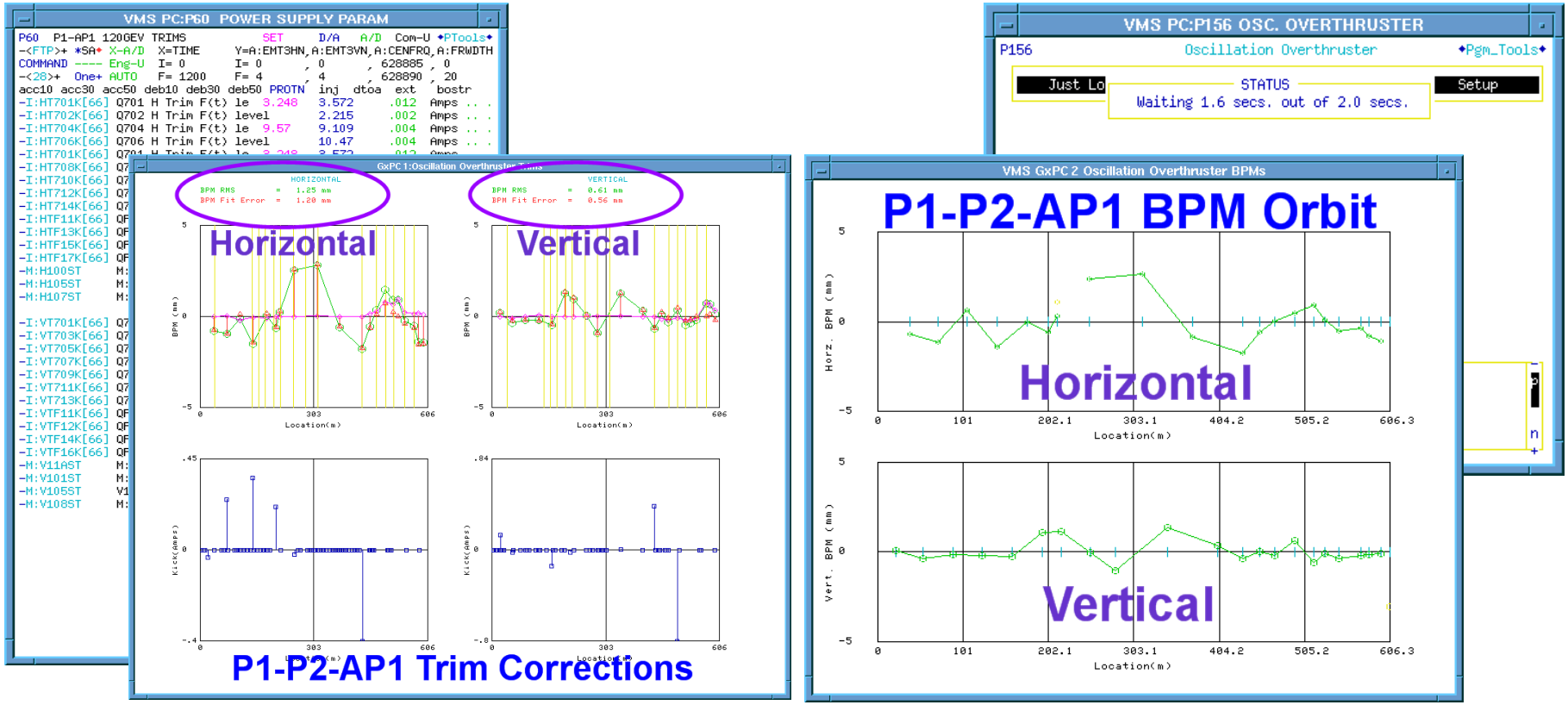
Use BPMs for Beamline Tune-up

- **New Beamline Tune-up**
  - Set P1-P2-AP1 BPM orbit using P156 oscillation overthruster to change trims in all three lines
  - Set AP2 BPM positions using M:VT108 and M:HT105.



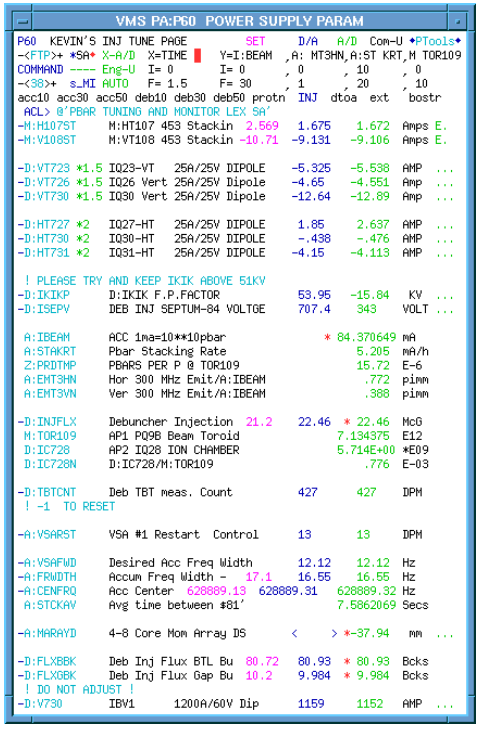
Oscillation Overthruster Application

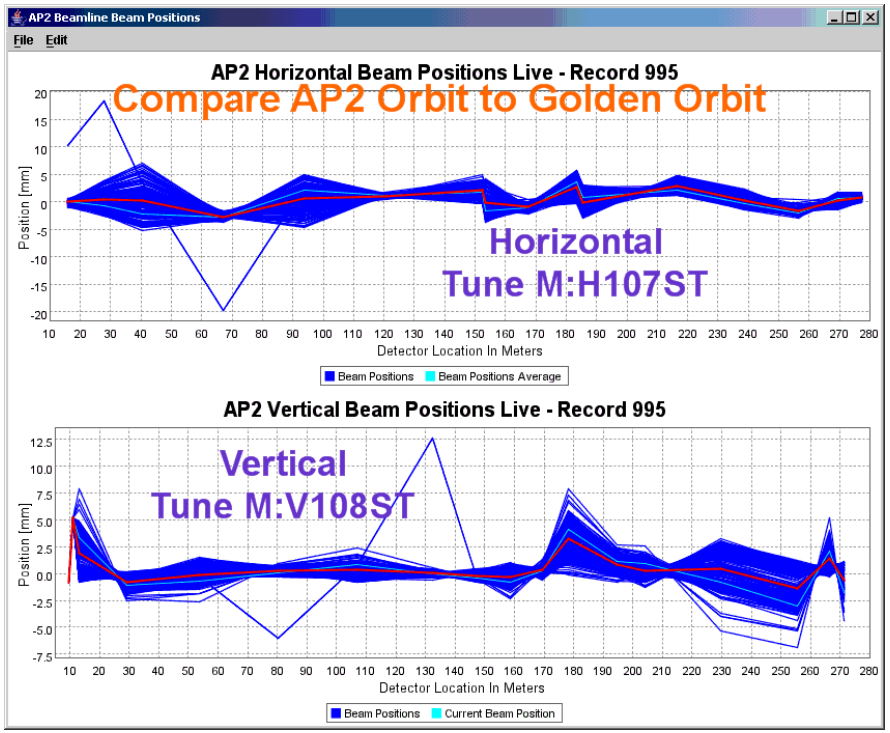
- P156 takes BPM orbits and calculates trim corrections for the P1-P2-AP1 lines



Set AP2 Positions

- Set AP2 positions with HT107 and VT108





What's Next?

- Next Two Weeks: Analysis and Write-ups
- Week of January 5th: Review results
- Week of January 9th? Presentations?
- Late January – Early February: Studies Round 2.